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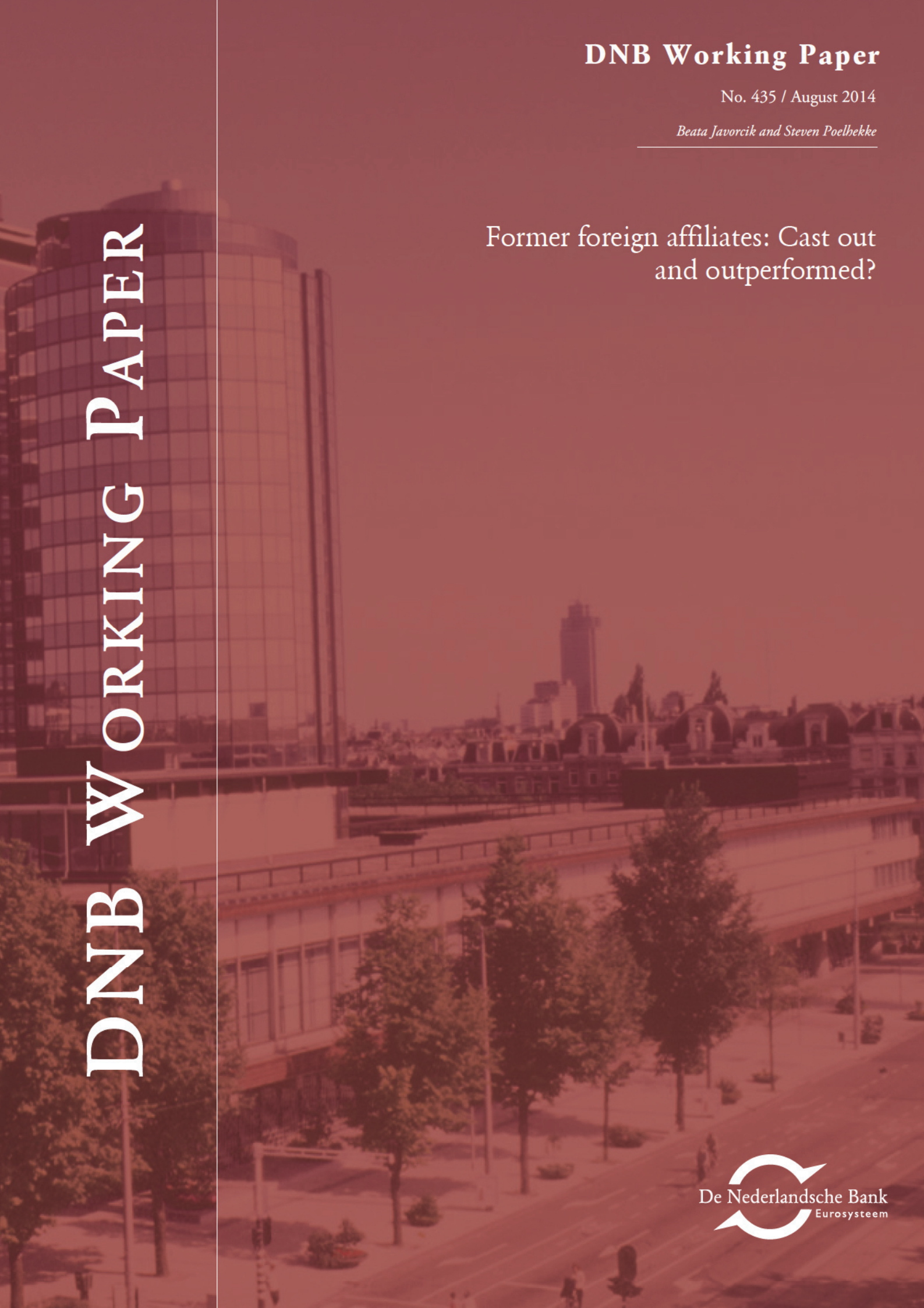

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* Views expressed are those of the authors and do not necessarily reflect official positions of De Nederlandsche Bank.

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Former foreign affiliates: Cast out and outperformed?

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Abstract

The literature has documented a positive effect of foreign ownership on firm performance. But is this effect due to a one-time knowledge transfer or does it rely on continuous injections of knowledge? To shed light on this question we focus on divestments, that is, foreign affiliates that are sold to local owners. To establish a causal effect of the ownership change we combine a difference-in-differences approach with propensity score matching. We use plant-level panel data from the Indonesian Census of Manufacturing covering the period 1990-2009. We consider 157 cases of divestment, where a large set of plant characteristics is available two years before and three years after the ownership change and for which observationally similar control plants exist. The results indicate that divestment is associated with a drop in total factor productivity accompanied by a decline in output, markups as well as export and import intensity. The findings are consistent with the benefits of foreign ownership being driven by continuous supply of headquarter services from the foreign parent.

Keywords: divestment, foreign direct investment, Indonesia, productivity.
JEL Classification: F23.

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I. Introduction

Countries around the world compete fiercely to attract foreign direct investment (FDI). Their interest in bringing FDI is motivated by the belief that foreign investors not only create jobs but are also a channel of knowledge transfer across international borders. And indeed many studies have documented superior performance of foreign affiliates with a few being able to establish a causal effect. Among the latter, Arnold and Javorcik (2009) found that foreign acquisitions of Indonesian plants resulted in a 13.5 percent productivity boost after three years under foreign ownership. The rise in productivity was a result of restructuring, as acquired plants increased investment outlays, employment and wages. Foreign ownership also enhanced the integration of acquired plants into the global economy through increased exports and imports. A similar result was established in the Spanish context where Guadalupe et al. (2012) showed that foreign acquisitions resulted in more product and process innovation and adoption of foreign technologies, leading to higher productivity.[1] The superior performance of foreign affiliates is not surprising given that only the most productive firms are able to incur the fixed cost of undertaking FDI (see Helpman et al. 2004).

But how persistent are the benefits of foreign ownership? Is the superior performance of foreign affiliates due to a one-time knowledge transfer or does it depend on continuous flow of knowledge from the parent firm? These questions matter profoundly for policy. Foreign investors are often given tax incentives or tax holidays, in the hope that their affiliates will become a source of knowledge spillovers to indigenous firms. How long they can remain such a source enters the cost-benefit calculation. The length of the tax incentives is usually prescribed by law, and tax incentives cannot be awarded after the foreign parent leaves. But we know little about the horizon over which the benefits accrue. If foreign affiliates retain their productivity advantage even after the foreign parent leaves, the value proposition of such tax policies is much greater than if the advantage evaporates with the parent's exit.

To shed light on these issues we examine developments in foreign affiliates that were sold by their parents to local owners. We use plant-level data from the Indonesian Census of Manufacturing covering the period 1990-2009 and consider cases of foreign affiliates whose ownership was transferred to Indonesian hands. More specifically, we focus on plants that were at least 50 percent foreign owned and whose foreign ownership dropped to less than 10 percent (a standard threshold

[1] A positive, albeit much smaller, effect of foreign ownership was also found by Fons-Rosen et al. (2014). In contrast, Wang and Wang (2014), who compare foreign acquisitions to domestic ones, do not find a positive impact of foreign ownership on productivity.

used in the literature to denote foreign direct investment) and remained so for at least three years. We are able to consider 157 cases of divestment where a large set of plant characteristics are observed two years before and three years after divestment and for which observationally similar control plants exist.

To establish a causal effect of the ownership change we combine a difference-in-differences approach with propensity score matching. To create a missing counterfactual of how foreign plants would have performed in the absence of divestment we use as a control group foreign affiliates similar in terms of observable characteristics, operating in the same industry in the same year, which remain in foreign hands. Then we compare changes in various aspects of plant performance between the year prior to divestment and years following the ownership change among the treated (divested) plants and the control group.

If the divestment decision was driven by affiliate characteristics, it will be controlled for through our matching exercise. If it was driven by unobservable time-invariant heterogeneity related either to the parent or the affiliate, it will be controlled for through the difference-in-differences approach. As we consider a short time horizon (2 years in the baseline specification), the latter method will capture developments such as financial shocks or a permanent productivity increase experienced by the parent company.[2]

Our variables of interest include the total factor productivity (TFP), output, markups, employment, average wage, export intensity and reliance on imported inputs. TFP and markups are estimated following a method proposed by De Loecker and Warzynski (2012). The advantage of this method lies in allowing for markup estimation based on plant-level data without the need to specify how producers compete in the product market.

The results indicate that divestment is associated with a 3.8% point productivity drop among divested plants relative to the control group. The decline is registered in the year of ownership change and persists over time. A large and growing gap in output emerges between the divested

[2] A recent paper by Mrázová and Neary (2013) provides a rationale for why we may observe divestment by multinationals, which are unrelated to the Great Recession, the Asian crisis of the 1990s or even observed characteristics of the affiliates being sold. Helpman, Melitz, Yeaple (2004) show that more productive firms can increase profits by paying the fixed costs of setting up overseas operations and saving on transportation costs. These are, therefore, more likely to engage in FDI rather than exports to serve a foreign market. Mrázová and Neary (2013) extend this by showing that it holds only if variable costs of production and marginal cost of serving the market are complementary. Lower trade costs will then benefit low cost firms more than they benefit high cost firms, since the former firm will already sell more abroad. They show that if this does *not* hold (which itself depends on the preference structure for example), then it is possible that a very productive firm may have little to gain from engaging in FDI because its trade costs are already very low: paying an additional fixed cost to save on (small) trade costs may then not increase profits anymore. Similarly, very productive firms may choose not to invest directly in foreign markets if their productivity advantage over other firms is large enough that they have little to gain in terms of wage costs from offshoring to low wage countries. Their wage bill is too low to warrant paying the additional fixed cost of engaging in vertical FDI. Although this argument relates mostly to the cross-section productivity distribution of firms, it is possible to envisage that a growing multinational firm will reverse previous offshoring decisions once they become even more productive. For example, Yeaple (2009) shows that there is less evidence for FDI in US data than would be expected from the distribution of productivity.

plants and the control group. It ranges from 28% points in the year of divestment to 54% points two years later. This gap is driven by export sales. The decline in output is accompanied by lower markups and lower reliance on imported inputs. Perhaps to compensate for the smaller scale of production, divested plants lower their employment by shedding production workers. Blue-collar employment goes down by 15.3% points in the year of divestment relative to the control group, though in the subsequent years the difference between the treated and the control plants ceases to be statistically significant. The observed patterns are robust to considering a longer time horizon (5 years) after divestment.

The observed pattern is consistent with sold affiliates being partially cut off from the distribution network of their former parent company which results in a negative demand shock. The lower scale of production and lower markups explain, however, only a small part of the productivity decline. Our results are more suggestive of the change in ownership leading to a disruption in performance due to the change in the management team, departure of expatriate managers employed by the former foreign parent and/or loss of headquarter services. The interpretation of our findings is in line with the conclusions of the recent economics literature pointing out the importance of individual managers and the quality of management practices to firm performance.[3]

While transfer pricing is usually a concern in studies of foreign affiliates, our results are unlikely to be driven by this phenomenon. Transfer pricing could potentially affect outcomes such as the value of output, markups and the TFP, but it is unlikely to affect employment. Moreover, if transfer pricing were responsible for the patterns observed, we would expect to see larger effects of divestment on former fully foreign-owned affiliates than on other affiliates. No such difference is observed in the data.

Interestingly, divested plants remain different from the population of domestic plants. They tend to be much larger in terms of output and employment, and more reliant on exports and imports. They also pay higher wages and charge higher markups. Their also enjoy a small productivity advantage. However, these “former affiliate premia” decline with time.

Our results are broadly consistent with the view that the superior performance of foreign affiliates observed around the world is driven by continuous knowledge injections from the parent company to their overseas affiliates. To the best of our knowledge, this is the first study to document this pattern.

This study is structured as follows. The next section presents the data and the empirical strategy. Section III discusses the baseline results. Section IV considers the longer time horizon, while Section V examines whether transfer pricing could be responsible for the patterns observed. Section

[3] See Section VI for a more detailed discussion.

VI interprets the results, and Section VII compares divested affiliates to local plants. The last section contains the conclusions of the study.

II. Data and Empirical Strategy

Data

Our data come from the *Survei Manufaktur*, the Indonesian Census of Manufacturing conducted by the National Statistical Office (BPS) on annual basis since 1975. The census surveys all registered manufacturing plants with more than 20 employees. It contains detailed information on a large number of variables, including output, inputs, ownership and participation in international trade. Our dataset covers the period 1990-2009 and contains more than 432,215 plant observations, of which about seven percent belong to foreign-owned plants. The average spell a plant remains in our sample is about 12 years.

Indonesia is a suitable country for studying consequences of FDI. It has received large inflows of FDI, worth over 41 billion dollars during the period under consideration.[4] It has also experienced exit of many foreign investors, notably in the aftermath of the Asian Crisis. The high quality of the data collected by the BPS has also attracted many academics. For instance, the works of Arnold and Javorcik (2009) and Blalock, Gertler, and Levine (2008) rely on the same data, though focus on the earlier time period.

Empirical Strategy

In our analysis, we follow the approach of Arnold and Javorcik (2009), but rather than focusing on foreign acquisitions we consider cases of divestment. We examine changes from foreign to domestic ownership taking place within the same plant. More specifically, we consider plants in which initially at least fifty percent of equity belongs to foreign owners and where the foreign equity share drops to less than ten percent. There are 1,709 such cases in our dataset, of which 348 allow us to observe the main plant characteristics two years prior and three years after the ownership change. Of these, we are able to match 157 cases to observationally similar control plants. In principle, it is possible to find matches for all plants. However, to ensure that the quality of our matches is high we restrict the set of potential matches to plants within the same year and sector. This forces us to drop 54 treated plants for which no potential control plant exists within the

[4] Including losing 14.7 billion dollars between 1998 and 2003 (this figure is expressed in 2005 USD and comes from the *World Development Indicators* 2014).

same sector and year. We also make sure that the distance between the two plants in terms of probability of divestment (i.e., the so called caliper) is at most 3% points for any pair of treated and control plants, which forces us to drop another 137 treated plants. Relaxing the latter constraint yields more matches, but we then no longer find that each control variable has the same mean across treated and control plants within the matched sample.

The distribution of matched divested plants across ISIC 2-digit industries is presented in Figure 1 below. The largest number of divestments is found in food and beverages (ISIC 15), textiles (ISIC 17), apparel (ISIC 18), furniture (ISIC 36) and leather (ISIC 19).

The percentage of foreign equity share prior to divestment is depicted in Figure 2. Our sample encompasses a large number of affiliates which are 100% foreign owned, a large number of affiliates with majority foreign ownership as well as many cases in between.

To compare the performance of divested plants with the performance of plants remaining in foreign hand we use a difference-in-differences approach. In this way, we eliminate the influence of all observable and unobservable non-random elements of the acquisition decision that are constant or strongly persistent over time. More specifically, we compare the change in variables of interest taking place between the pre- and post-acquisition years in the divested plants to those in the control group.

As this comparison is still vulnerable to problems of non-random sample selection, we combine the difference-in-differences approach with propensity score matching. The latter technique controls for the selection bias by restricting the comparison to differences within carefully selected pairs of plants with similar observable characteristics prior to ownership change. Its purpose is to construct the missing counterfactual of how the divested plants would have behaved had they not been sold by their foreign owners. The underlying assumption for the validity of the procedure is that conditional on the observable characteristics that are relevant for the divestment decision, potential outcomes for the treated (divested) and non-treated plants (those remaining in domestic hands) are orthogonal to the treatment status.

In the context of our exercise, the propensity score is the predicted probability of the foreign equity share in a plant changing from above fifty to under ten percent. When constructing the pairs of observations matched on the propensity score, we make sure that the matched control observations are assigned only from the same year and the same 4-digit ISIC sector as the divested plant. This eliminates the possibility that differences in plant performance observed across sector-year combinations exert influence on our estimated effects.

The combination of matching and a difference-in-differences approach means that we look for divergence in the paths of performance between the divested plants and the matched control plants that had similar characteristics prior to the ownership change. The analysis begins in the year prior

to divestment and focuses on the (cumulative) change in performance over the following year and then each of the subsequent two periods.

TFP and Markups

When measuring TFP and markups (defined as the price-marginal cost margin), we follow the method proposed by De Loecker and Warzynski (2012) who build on Ackerberg, Caves and Frazer (2006). The TFP estimation proceeds as follows. First, for each 2-digit ISIC sector we estimate a translog production function of the log value added in (the log of) capital and labor (including two lags and all interactions), allowing for different coefficients by exporter and foreign ownership status, year and 4-digit ISIC industry. The plant-specific demand for materials is used to proxy for unobservable productivity shocks.[5] By treating exporter and foreign ownership status of plants as state variables (such plants may face different input prices, for example), we allow for differences in optimal input demand and do not have to make further assumptions on the underlying model of competition in each sector.[6] The estimation yields a measure of expected output φ, and unexplained output ε, for each plant-year combination. The unobservable productivity shock is then recovered as $\omega = \hat{\varphi} - \beta_l l - \beta_k k - \beta_{ll} l^2 - \beta_{kk} k^2 - \beta_{lk} lk$ where l and k stand for the log of labor and capital, respectively, and plant-year subscripts are omitted on all variables. In the second step, we nonparametrically regress TFP on its lag to recover innovations to TFP, which should not be correlated with current capital nor its square (both of which are decided a period ahead). Current labor does correlate with TFP innovations which is why current labor is instrumented with lagged labor. These moment conditions are then used to estimate the translog production function using the GMM approach.

To calculate markups, we use the output elasticity of labor estimated in the production function. Dividing it by the ratio of the wage-bill and expected output yields the markup.[7]

Propensity Score Matching

Our estimation of the propensity score (divestment decision) proceeds as follows. We estimate a probit model where the dependent variable takes on the value of one when plant *i*, which used to have at least fifty percent foreign equity at time *t-1*, sees a decline in foreign equity to share to less

[5] Value added is reported directly in the Census of Manufacturing. Capital input is proxied with the value of fixed assets, labor with the number of employees. Value added, capital and material inputs are expressed in constant Indonesian rupiahs. Nominal values were deflated using producer price indices specific to 5-digit ISIC industries.

[6] The only assumption is monotonicity of materials in productivity, which holds in many models of imperfect competition (De Loecker and Warzynski 2012).

[7] The wage-bill is divided by expected output rather than output to make sure that the price ratio is only driven by variation in variables that drive input demand.

than ten percent at time *t*. In all other cases, the dependent variable is equal to zero. We narrow our attention to the sample of foreign-owned plants in which foreign owners hold at least half of the equity at *t-1*.

The choice of explanatory variables is guided by the work of Arnold and Javorcik (2009). All explanatory variables are lagged one period and, where appropriate, they enter in a log form and are measured in constant Indonesian rupiahs (with base year 2000).[8] The level variables pertain to *t-1*, while variables expressed as growth rates capture changes between *t-2* and *t-1*. The explanatory variables include TFP and its TFP growth, markup, its square, cube and growth, employment, its square and cube, percentage of output exported, share of imported inputs, skill intensity (ratio of non-production workers to total workers), capital intensity, output (goods produced), average wage, plant's age and some interaction terms between explanatory variables. The model also controls for the time trend and includes a dummy for the years of the Asian crisis.[9]

As can be seen in Table 1, we find that foreign owners are more likely to sell smaller and less skill-intensive affiliates as well as affiliates that are less reliant on imported inputs, pay lower wages and affiliates charging lower markups. While these findings point to less sophisticated affiliates being divested more frequently, we also find that this is true for affiliates experiencing a faster TFP growth. Affiliates which are 100% foreign owned are more likely to be divested. In contrast, affiliates set up as greenfield projects are less likely to be sold.[10] Finally, fewer divestments take place during the years of the Asian crisis.

Once we obtain the propensity score, we use the nearest neighbor method to build the control group. Our matches come from the same sector-year cell as the treated plants. Our matching procedure performs quite well as there is no statistically significant difference in terms of any plant characteristics between the treated and the control group (see Table 2).[11]

[8] Nominal values were deflated using producer price indices specific to 5-digit ISIC industries.

[9] The last year of divestment included in the sample is 2007 which is why the crisis dummy also takes on the value 1 in 2007, the first year of the Great Recession. The peak in divestments in the sample on which propensity score is calculated occurs in 1997 (with 37 cases), the first year of the Asian crisis. In 1998 and 1999 only 15 and 13 more divestments are made, respectively. In term of the number of divestments observed, 2007 was an average year (21 divestments). In the raw data the peak of divestments is actually in 2002, but for many of the plants we observe too little information to be able to include them in the analysis.

[10] A greenfield dummy takes on a value of one for a foreign affiliate that appears in the data for the first time as a 100% foreign owned and was not in the database in the year 1990 (which is the first year available in the data), and zero otherwise.

[11] After matching, the median propensity score difference (probability of divestment) within matched pairs is only 0.46% points.

III. Results from the Difference-in-Differences Analysis on the Matched Sample

Impact of divestment on TFP, output and markups

Once we find the control group, we estimate the following regression:

$$\Delta Outcome_{it+s} = Outcome_{it+s} - Outcome_{it-1} = \alpha + \beta Divestment_{it} + \varepsilon_{it}$$

where outcome denotes various outcomes of interest, *i* denotes plant and *t* year, and $s \in \{0,1,2\}$. In other words, we focus on the change in outcome between the year prior to the divestment and the year of divestment or each of the two subsequent years. The coefficient β captures the average treatment effect on the treated (ATT), that is, the effect of divestment.

The first outcome we consider is the TFP (see the top panel of Table 3). We find that divested plants experience a drop in productivity relative to the control group. The TFP declines by 3.8% points in the year of ownership change and the decline persists in the two subsequent years. In other words, our results suggest that had the divested affiliates remained in foreign hands, they would have become more productive. The left panel of Figure 3 present productivity trajectories of the two groups. While the control plants experience a steady productivity growth, the divested affiliates register a dip in the year of divestment and then slowly recover almost to the pre-divestment TFP level, but they do not manage to catch up with the control group. As the averages hide a lot of variation, Figure 4 presents the distribution of TFP growth between the year prior to divestment and the divestment year for both groups of plants. We can clearly see from the graph that the distribution of productivity growth among the control plants is shifted to the right relative to the divested plants.

The decline in performance is accompanied by a steep drop in output growth relative to the control group: about 28% points in the year of divestment and 54% points two years later. In other words, had the affiliates remained foreign owned, they would have seen a much faster increase in output. As can be seen from the middle panel of Figure 3, output of divested plants drops in absolute terms in the year of divestment and keeps declining. By the second year after divestment the gap between treated and control plants widens even further.

We also observe a large drop in markups relative to the control group of about 28% points in the first two year after ownership change. The difference between the two groups is somewhat smaller in the last period considered, but it remains statistically significant. Again Figure 3 (right panel) is quite informative here. It shows a relatively stable path of markups in the control group in the first two years and a very steep and persistent drop among the divested plants. After two years, markups

converge a bit on average, but the difference between the two groups persists.[12]

There are several possible scenarios consistent with the results we have obtained so far. The first scenario is that of the divested plants being cut off from the former parent's production and distribution networks and thus experiencing a negative demand shock, which translates into lower output and lower productivity due to loss of economies of scale. The second possibility is that divestments result in management change and loss of headquarter services, which is then reflected in an inferior performance. The final possibility is that the observed results are due to transfer pricing and are therefore an accounting, rather than a real, phenomenon.

Loosening ties with the former parent

To get a better understanding of what leads to lower output, in Table 4 we focus on international trade and domestic sales. We find that divested affiliates decrease the share of output that is exported. While this effect is not statistically significant in the year of divestment, it is significant at the one and five percent level one and two years later, respectively. The gap between the two groups widens over time and in the last year considered the difference reaches 12% points. Figure 5 illustrates this point nicely. The control plants export a stable share of output (almost 43%) over time, while the divested plants see a steady decline in their reliance on exports to about 35% in the year of divestment, 28.8% a year later and 27.2% in the following year. This pattern is consistent with the divested affiliate losing access to the parent company's distribution networks abroad.

As the reliance on exports goes down in the divested plants, little seems to be happening to local market sales. There is no statistically significant difference between the two groups, and Figure 5 indicates that, if anything, the treated plants on average seem to increase their domestic sales by more than the control group.

In the bottom panel of Table 4, we examine the impact of divestments on the share of imported inputs (in total inputs). We find that divested plants register a drop in their reliance on imported inputs already in the year of divestment. This drop seems to persist in subsequent years. It is another piece of evidence suggesting that divested affiliates lose their connection to the parent firm's production and distribution networks.[13]

Do the demand shock and lower markups explain the productivity decline?

Next we examine to what extent the lower scale of production and lower markups are responsible

[12] There is, however, a lot of variation in terms of markups within each group.

[13] Alternatively, this pattern is consistent with lower quality products, which do not require imported inputs, being sold on the domestic market.

for the productivity decline. To do so we estimate the effect of divestment on the TFP controlling for the change in output and/or markups:

$$\Delta \log TFP_{it+s} = \alpha + \beta_1 Divestment_{it} + \beta_2 \Delta \log Markup_{it+s} + \beta_3 \Delta \log Output_{it+s} + \varepsilon_{it}$$

Our TFP measure is estimated based on output values rather than quantities and thus a drop in prices charged by divested plants would translate into a lower TFP. The results, presented in Table 5 below, suggest that only a small portion of the TFP decline is explained by a drop in markups. Similarly, only a small portion of the productivity drop is explained by a decline in output.

Impact of divestment on other aspects of plant performance

How do divested plants cope with the new circumstances? As illustrated in Figure 6, they cut their workforce in absolute terms in the divestment year. While they increase employment in the two subsequent years, its level remains below the original one. During the same time frame, affiliates remaining under foreign control see a substantial increase in their workforce. When compared to the plants remaining in foreign hands, the treated plants cut their employment by about 12% points in the first year under new ownership. The difference between the two groups declines in the subsequent year and ceases to be statistically significant (see Table 6). It is most likely this drastic cut in employment that allows the divested plants to limit the decline in productivity stemming from a lower scale of operations. When we consider separately employment of production and non-production workers, we find that the former group bears the brunt of the layoffs.

Finally, we find that divested plants register a slower growth in the average wage relative to the control group. The difference between the two groups is not statistically significant until the last year considered when it reaches 18.3% points. The average wage declines in the divested plants in absolute terms, while wages keep increasing in the control group (see Figure 6).[14]

In tables, not reported here, we considered other outcomes. We found no statistically significant difference between the two groups in terms of investment or the probability of exit.

We also performed a robustness check by adding a crisis dummy taking on the value of one if the post-divestment year considered was a year of the Asian crisis or the recent Great Recession (i.e., 1997-99 and 2007-9). The augmented specification leads to very similar results.

How large are these effects in absolute terms? A back-of-the-envelope calculation suggests that one million dollars of divestment is associated with 239 jobs lost in the year of divestment.

[14] In the regressions not reported here, we find that the skill intensity increases in the divested plants, though the effect is statistically significant only weakly and only in the year of divestment.

IV. Longer time horizon

Next, we consider a longer time horizon by narrowing our attention to divested plants observed for at least five years after the ownership change. As this robustness check is performed on a different sample of treated plants, it involves a new estimation of the propensity score and a new choice of the control group.[15] Although focusing on the longer time horizon means considering only 103 cases of divestments, the results from this exercise are broadly consistent with those we have found earlier, but, as expected, they are less precisely estimated.

The results, presented in Table 7, confirm our earlier finding of a persistent decline in productivity among divested plants relative to the control group. We find a persistent output gap between the divested and the control plants. The estimated coefficients in the markup regression bear negative signs but reach conventional significance levels only two and four years after divestment.

In sum, we confirm our main message that losing foreign owners negatively affects the plant performance.

V. Transfer pricing

One may be concerned that our results are affected by transfer pricing. If tax rates faced by multinationals in Indonesia are lower than those in other countries either because of differences in statutory tax rates or because of tax holidays, multinationals may have an incentive to inflate their profits registered in Indonesia, thus artificially inflating TFP, markups or the value of output. Transfer pricing activities stop after divestments, which brings the value of TFP, markup and output down, consistent with the patterns observed in the data.[16]

There are two reasons why we do not believe that transfer pricing can be the primary driver of our findings. First, the observed changes in employment suggest that the output decline is a real rather than an accounting phenomenon. Second, Indonesia has explicit regulation against transfer pricing in place since 1984, giving tax authorities the ability to adjust related party transactions (KPMG, 2013). In 1999 Indonesia was among only 32 countries in the world to have such rules (Merlo et al. 2014). Thailand for example, introduced such rules only in 2002 and China did not have comprehensive rules on transfer pricing until 2008 (KPMG, 2013).

[15] For instance, we are unable to consider divestments during the last four years of the sample period, which means that we lose two years relative to the baseline exercise.

[16] Of course, it is not obvious that on average the tax regime is more advantageous in Indonesia than in other countries. According to KMPG, the corporate tax rate in Indonesia is 25%, while the OECD average is 24% (http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx),.

Nevertheless, to gain a better understanding of the issue we perform an additional exercise. We take advantage of the observation that the incentives to engage in transfer pricing are strong in the case of fully-owned foreign affiliates, but not in the case of partially-owned ones. This is because in the latter case the profits shifted to Indonesia would have to be shared with a local partner. In 49 out of 157 cases, foreign affiliates we consider were 100% foreign owned before divestment.
The results, presented in Table 8, suggest that the effects of divestment on the TFP, markups and output are not significantly different for former fully foreign owned affiliates. While our earlier conclusions about divestments leading to inferior performance are confirmed, we find no evidence of affiliates which were 100% foreign owned prior to being sold being more negatively affected. None of the interactions between the divested dummy and the 100% ownership dummy is statistically significant and in most cases the coefficients bear a positive sign. There results attenuate our concerns about transfer pricing driving the patterns observed in the data.

VI. Interpretation of the findings

In our discussion, we considered three possible explanations for the TFP decline: (i) a negative demand shock leading to losing economies of scale; (ii) loss of expatriate managers and injections of knowledge from headquarters; (iii) transfer pricing. While our results support the first explanation, they also indicate that it captures only part of the story. We have no evidence suggestive of transfer pricing driving our results. Thus loss of expatriate managers and injections of knowledge from headquarters remains our prime suspect.
To go a bit deeper into the last point, we examine whether the effects of divestment are stronger for former affiliates that were originally set up as 100% greenfield projects. It is widely believed that multinational firms tend to transfer more knowledge and know-how to their fully owned affiliates (Mansfield and Romero 1980; Ramacharandran 1993; and Javorcik and Saggi 2010). Moreover, greenfield affiliates are more likely to be less embedded in the local economy, and thus in the event of expatriate management leaving less well positioned to replace them with local staff.
Indeed Table 9 suggests that the TFP decline is much larger (twice or three times as large) for former greenfield affiliates. This effect is statistically significant in the year following the ownership change and one year later. It is also robust to controlling for 100% foreign ownership in the year prior to divestment.

In sum, our results are suggestive of the change in ownership leading to a disruption in performance, most likely due to the change in the management team and departure of expatriate managers em-

ployed by the former foreign parent.[17] The interpretation of our findings is in line with the conclusions of the recent economics literature.

The recent economics literature has drawn attention to the importance of manager's quality and management practices for firm performance. For instance, Bertrand and Schoar (2003) find that manager fixed effects matter for a wide range of corporate decisions. A large portion of the heterogeneity in investment, financial, and organizational practices of firms can be explained by the presence of manager fixed effects. Management practices display significant cross-country differences and are strongly correlated with firm productivity (Bloom and Van Reenen 2007). Structured management practices for performance monitoring, targets and incentives are tightly linked to better firm performance in the US (Bloom et al. 2014).

The literature has also documented that foreign firms transplant their management practices to host countries. For instance, while there is a wide dispersion in management scores across countries, the subsidiaries of foreign multinationals score highly regardless of their location. This multinational premium on management persists even after controlling for firm size. Multinationals also transplant other features of their organizational form overseas, such as the average degree of decentralization (Bloom, Sadun, and Van Reenen 2012).

Expatriate staff plays an important role in transplanting management practices across international borders. Marin et al. (2014) mention that 43% of eastern European affiliates of German and Austrian multinationals had at least one manager sent from the headquarters. The average number of expatriate managers per affiliate was 2.63.

Finally, it has been shown that improvements in management practices translate into better performance within months (Bloom et al. 2013).

VII. A different perspective

How do divested plants compare to the population of domestic manufacturing plants? To answer this question we consider a sample of domestic and divested plants (the latter only in the post-divestment window). We regress various outcomes of interest on the dummy for divested plants, controlling for plant size (in terms of employment) and industry-year fixed effects (4 digit ISIC code). The results are presented in the top panel of Table 10 below.

[17] Our results are consistent with the conclusions of Arnold and Javorcik (2009) suggesting that foreign acquisitions boost the performance of acquired plants in Indonesia through introduction of better management practices. It is quite likely that departure of expatriate managers in the aftermath of divestment has a negative effect on performance.

We find that relative to Indonesian plants operating in the same industry, divested plants have on average a 22% higher output and a 2.8% higher markups. As the regressions control for employment, the output premium essentially captures the labor productivity premium. The productivity advantage measured in terms of TFP is, however, small (1.6%). It compares unfavourably to the 6% TFP premium enjoyed by foreign affiliates in general.[18] Divested plants are much larger than domestic plants employing on average 140% more workers, both of the white and blue collar type. While their skill intensity premium is statistically significant, its magnitude (1%) is not economically meaningful. Divested plants are more export intensive, exporting on average a 5.2% point higher share of the output. They are also more import intensive with a 8.2% point higher share of imported inputs.

More interestingly, the advantage of foreign ownership fades away as the time passes by. This is clearly visible in the bottom panel of Table 10 when we allow a different former affiliate premium in the year of divestment, one year later and in the subsequent years.

VIII. Conclusions

Considering developments in divested plants has allowed us to gain a better understanding of the contribution foreign owners make to their foreign affiliates. Our results are consistent with the parent company providing distribution networks and thus allowing their affiliates to benefit from scale economies. They are also in line with foreign affiliates benefiting from the superior management practices, probably reinforced by the presence of expatriate managers, and access to knowledge transfer from the parent company. In sum, we conclude that the benefit s of foreign ownership are due to continuous injections of knowledge and access to headquarter services.

[18] This observation is based on a regression result not reported in the table.

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Figure 1. Distribution of divested plants across industries

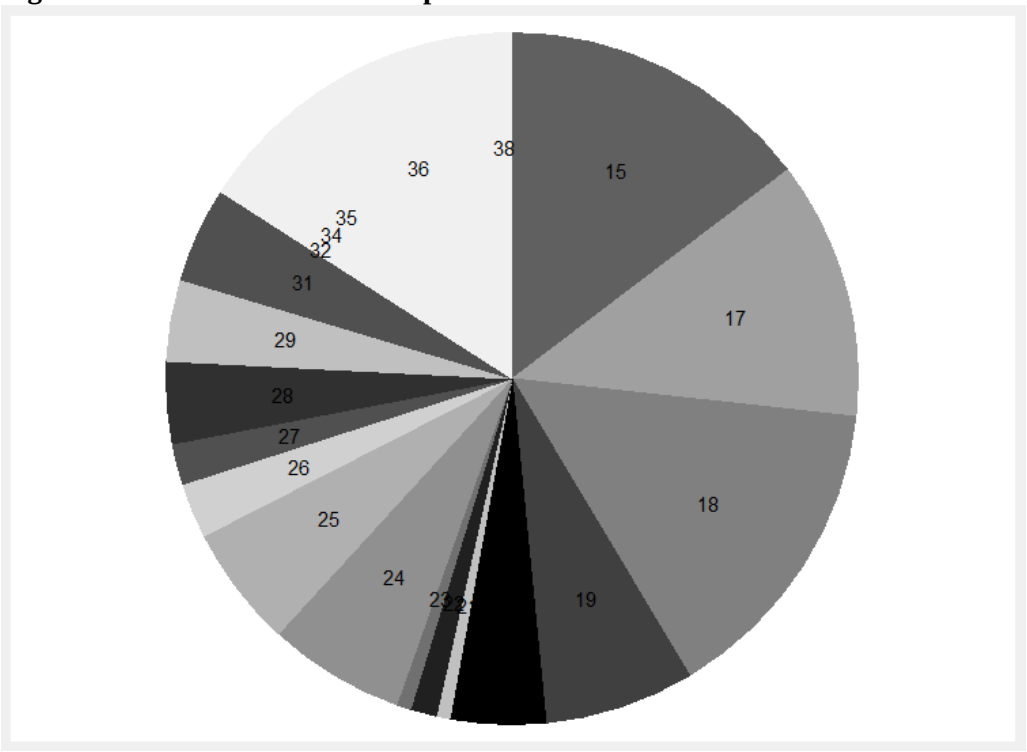


Figure 2. Distribution of foreign equity share prior to divestment

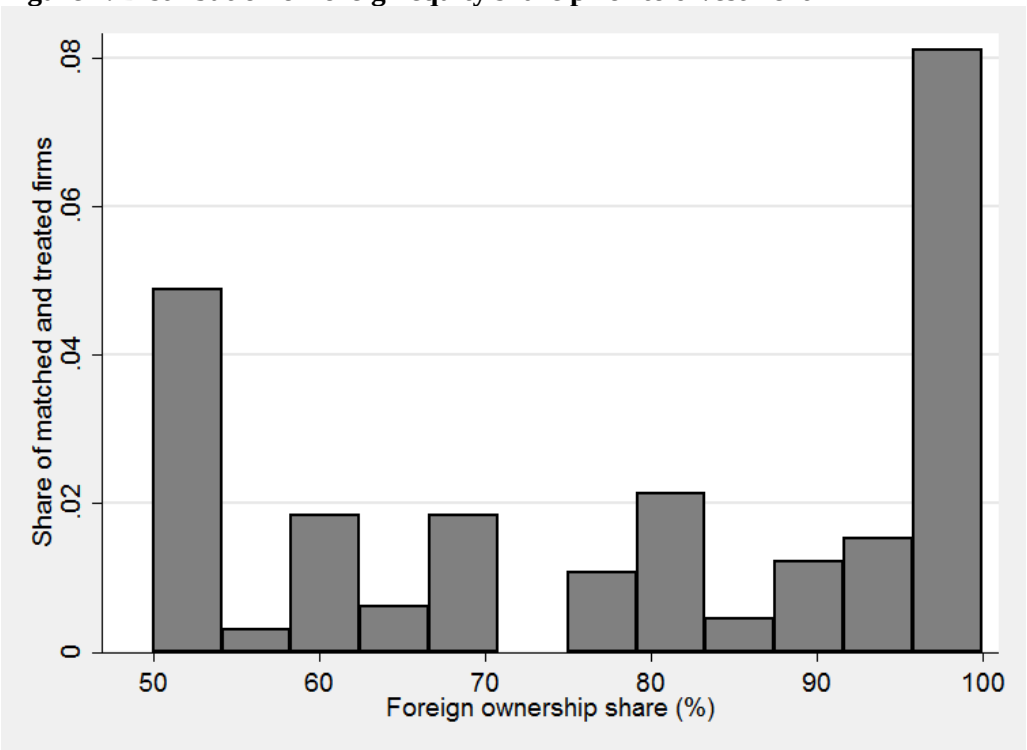


Table 1. Predicting divestments

log TFP $_{t-1}$	0.017
	(0.028)
Δlog TFP $_{t-1}$	0.053*
	(0.029)
log markup $_{t-1}$	-0.033*
	(0.017)
Δlog markup $_{t-1}$	0.001
	(0.003)
100% foreign owned $_{t-1}$	0.031***
	(0.004)
Entered as greenfield $_{t-1}$	-0.050***
	(0.008)
log Employment $_{t-1}$	-0.254***
	(0.057)
log Employment $_{t-1}^2$	0.033***
	(0.010)
log Employment $_{t-1}^3$	-0.002***
	(0.001)
Skilled labor share $_{t-1}$	-0.464***
	(0.103)
log Average wage $_{t-1}$	-0.022***
	(0.006)
Imported input share $_{t-1}$	-0.030***
	(0.005)
Age $_t$	-0.000
	(0.001)
Age $_t^2$	-0.000
	(0.000)
Age $_t^3$	0.000
	(0.000)
log Capital per worker $_{t-1}$	-0.004**
	(0.002)
log Capital per worker $_{t-1}$ * Age	0.000**
	(0.000)
Loan-financed investment$_{t-1}$/Output $_{t-1}$	-0.002
	(0.002)
log output $_{t-1}$	-0.033***
	(0.007)
% Exported $_{t-1}$	-0.001
	(0.001)
log(investment +1)$_{t-1}$	0.002*
	(0.001)
% Exported $_{t-1}$ * TFP $_{t-1}$	0.000
	(0.000)
log avg. wage $_{t-1}$ * markup $_{t-1}$	0.001
	(0.002)
% Exported $_{t-1}$ * markup $_{t-1}$	-0.000
	(0.000)
log output $_{t-1}$ * Skilled labor share $_{t-1}$	0.027***
	(0.006)
Crisis $_{t-1}$	-0.012**
	(0.005)
log markup^2 $_{t-1}$	0.003*
	(0.002)
log markup^3 $_{t-1}$	-0.000
	(0.000)
log(investment +1) $_{t-1}$ * log Employment $_{t-1}$	-0.000**
	(0.000)
log output $_{t-1}$ * log Employment $_{t-1}$	0.004***
	(0.001)

Time trend	-0.001**
	(0.000)
Observations	7,120
Pseudo R2	0.200

The results are presented in terms of marginal effects evaluated at the sample mean. Standard errors are listed in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 2. Test of the balancing hypothesis

	Treated	Control	t-test	p-value
log TFP $_{t-1}$	2.334	2.329	0.500	0.618
Δlog TFP $_{t-1}$	0.004	0.006	-0.460	0.649
log markup $_{t-1}$	1.782	1.800	-0.160	0.870
Δlog markup $_{t-1}$	0.074	0.002	0.720	0.473
100% foreign owned $_{t-1}$	0.312	0.325	-0.240	0.809
Entered as greenfield $_{t-1}$	0.076	0.064	0.440	0.660
log Employment $_{t-1}$	5.800	5.802	-0.020	0.987
log Employment $_{t-1}^2$	34.884	35.038	-0.100	0.920
log Employment $_{t-1}^3$	216.960	219.550	-0.180	0.857
Skilled labor share $_{t-1}$	0.195	0.183	0.630	0.528
log Average wage $_{t-1}$	8.747	8.742	0.050	0.957
Imported input share $_{t-1}$	0.325	0.341	-0.390	0.698
Age $_t$	13.197	12.019	0.850	0.397
Age $_t^2$	369.660	250.200	1.290	0.198
Age $_t^3$	18358.000	7732.300	1.500	0.134
log Capital per worker $_{t-1}$	10.227	10.258	-0.140	0.886
log Capital per worker $_{t-1}$ * Age	138.560	124.510	0.880	0.378
Loan-financed investment$_{t-1}$/Output $_{t-1}$	0.141	0.081	1.030	0.304
log output $_{t-1}$	17.250	17.257	-0.050	0.963
% Exported $_{t-1}$	40.290	42.051	-0.350	0.723
log(investment +1)$_{t-1}$	7.944	7.986	-0.050	0.962
% Exported $_{t-1}$ * TFP $_{t-1}$	93.774	98.050	-0.370	0.713
log avg. wage $_{t-1}$ * markup $_{t-1}$	14.931	15.506	-0.680	0.500
% Exported $_{t-1}$ * markup $_{t-1}$	67.030	66.143	0.080	0.934
log output $_{t-1}$ * Skilled labor share $_{t-1}$	3.354	3.146	0.640	0.524
Crisis $_{t-1}$	0.178	0.178	0.000	1.000
log markup^2 $_{t-1}$	4.3405	4.0441	0.45	0.651
log markup^3 $_{t-1}$	14.735	10.281	0.87	0.385
log(investment +1) $_{t-1}$ * log Employment $_{t-1}$	45.866	47.597	-0.32	0.752
log output $_{t-1}$ * log Employment $_{t-1}$	101.04	101.2	-0.05	0.959
Time trend	1999.3	1999.3	0	1

Table 3. Results for TFP, output and markups

	Divestment year	One year later	Two years later
		Δ log(TFP)	
Divestment	**-0.038*** **	**-0.043*** **	**-0.038*** **
	(0.007)	(0.007)	(0.008)
Observations	314	314	314
R-squared	0.090	0.095	0.065
		Δ log(Output)	
Divestment	**-0.345*** **	**-0.421*** **	**-0.537*** **
	(0.101)	(0.126)	(0.131)
Observations	328	328	328
R-squared	0.033	0.032	0.047
		Δ log(Markup)	
Divestment	**-0.280*** **	**-0.293** **	**-0.210** **
	(0.107)	(0.119)	(0.120)
Observations	314	314	314
R-squared	0.021	0.019	0.010

Notes: Bootstrapped standard errors are listed in parentheses. A constant is included in all specifications, but not reported. *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

Figure 3. Trajectories of divested and control plants: TFP, output and markups

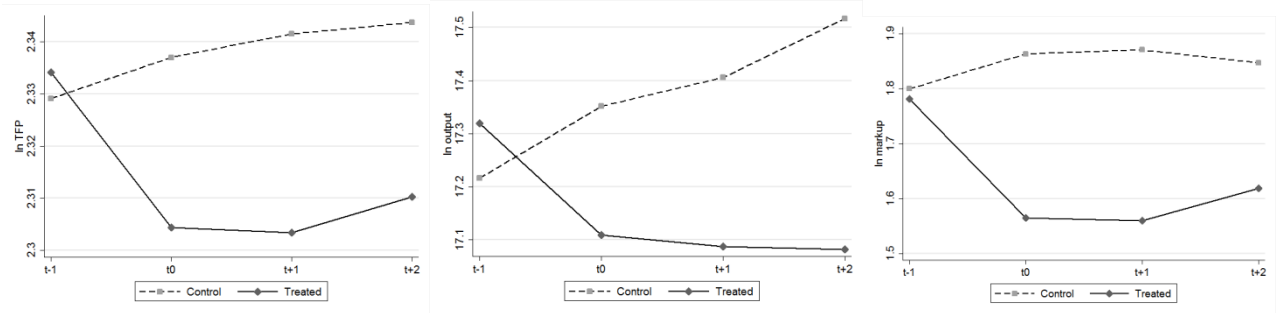


Figure 4. Distribution of TFP growth between the year before and the year of divestment among divested and control plants

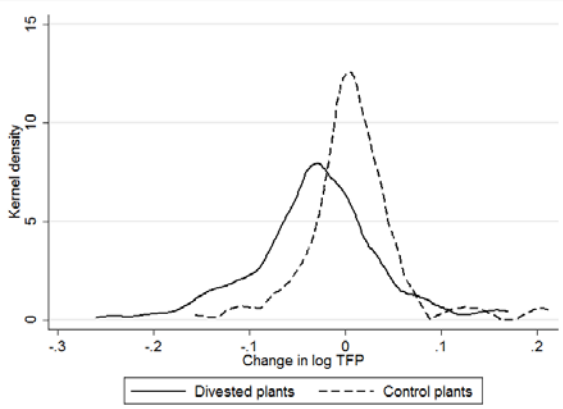
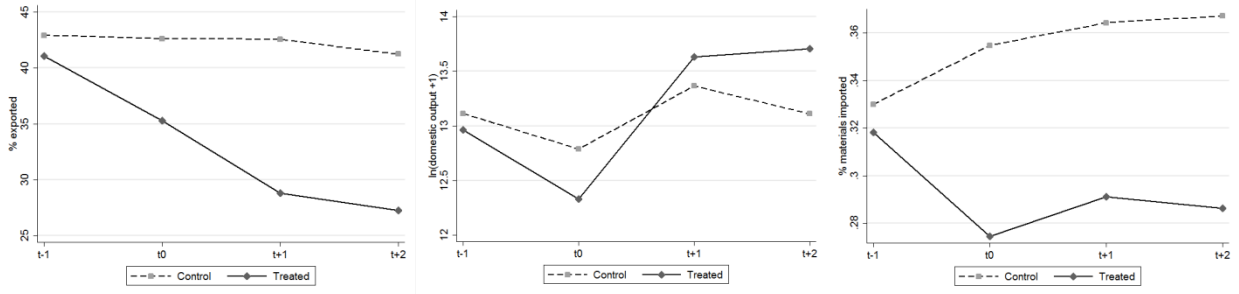


Table 4. Results for export share, domestic sales and imported inputs

	Divestment year	One year later	Two years later
		Δ Share of output exported (%)	
Divestment	-5.473	**-11.914*** **	**-12.138** **
	(4.020)	(4.556)	(4.900)
Observations	344	344	344
R-squared	0.005	0.019	0.018
		Δ log(Domestic sales +1)[19]	
Divestment	-0.304	0.416	0.749
	(0.714)	(0.772)	(0.856)
Observations	344	344	344
R-squared	0.001	0.001	0.002
		Δ Share of imported inputs	
Divestment	**-0.068** **	**-0.061** *	**-0.069** **
	(0.029)	(0.033)	(0.034)
Observations	338	338	338
R-squared	0.017	0.010	0.013

Notes: Bootstrapped standard errors are listed in parentheses. A constant is included in all specifications, but not reported. *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

Figure 5. Trajectories of divested and control plants: export share, domestic sales and imported inputs



[19] We added one before taking a log to avoid losing from the sample pure exporters.

Table 5. Results for TFP, controlling for changes in markups and scale

	Δ log(TFP)								
	Divestment year	One year later	Two years later	Divestment year	One year later	Two years later	Divestment year	One year later	Two years later
Divestment	**-0.030*** **	**-0.036*** **	**-0.033*** **	**-0.033*** **	**-0.031*** **	**-0.023*** **	**-0.029*** **	**-0.029*** **	**-0.021*** **
	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)
Δ ln(Markup)	0.026***	0.024***	0.026***				0.024***	0.016***	0.018***
	(0.006)	(0.006)	(0.007)				(0.006)	(0.006)	(0.005)
Δ ln(Output)				0.012*	0.027***	0.029***	0.005	0.022***	0.024***
				(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.005)
Observations	314	314	314	310	310	307	310	310	307
R-squared	0.248	0.224	0.189	0.119	0.273	0.266	0.244	0.323	0.320

Notes: Bootstrapped standard errors are listed in parentheses. A constant is included in all specifications, but not reported.
*, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

Table 6. Results for employment and wages

	Divestment year	One year later	Two years later
	Δ log(Employment)		
Divestment	**-0.120****	-0.082	-0.043
	(0.051)	(0.051)	(0.052)
Observations	344	344	344
R-squared	0.016	0.007	0.002
	Δ log (Employment of production workers)		
Divestment	**-0.153*****	-0.089	-0.045
	(0.059)	(0.063)	(0.067)
Observations	344	344	344
R-squared	0.020	0.006	0.001
	Δ log(Employment of non-production workers)		
Divestment	-0.008	-0.059	-0.037
	(0.078)	(0.089)	(0.094)
Observations	322	322	322
R-squared	0.000	0.001	0.000
	Δ log(Average wage)		
Divestment	-0.026	-0.095	**-0.183****
	(0.082)	(0.096)	(0.092)
Observations	344	344	344
R-squared	0.000	0.003	0.011

Notes: Bootstrapped standard errors are listed in parentheses. A constant is included in all specifications, but not reported. *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

Figure 6. Trajectories of divested and control plants: Employment and wages

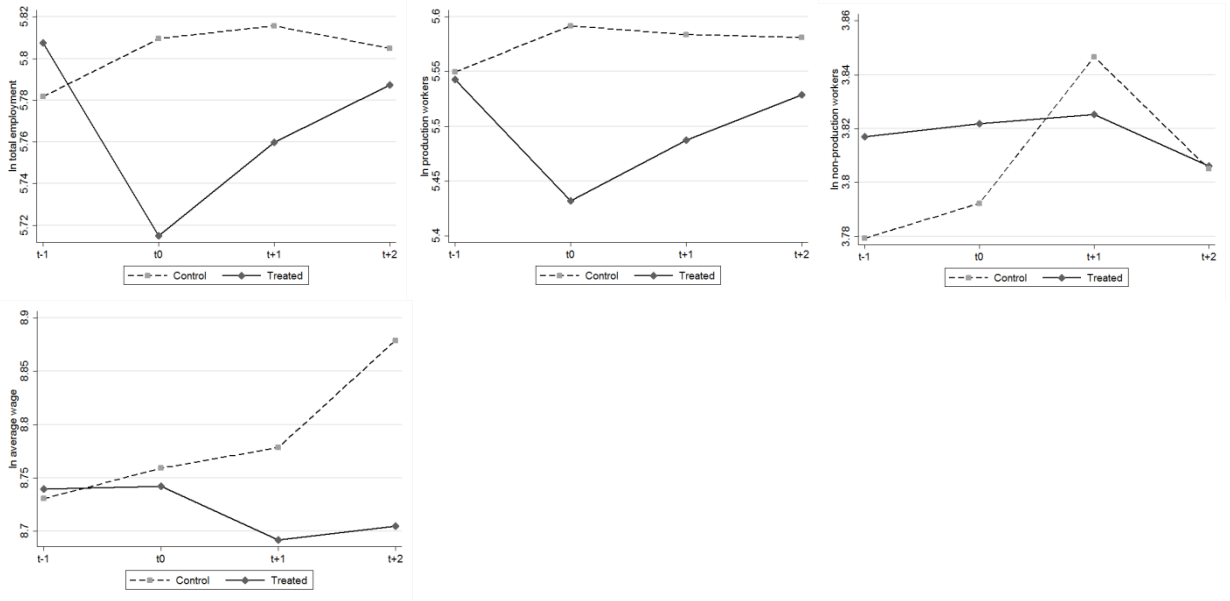


Table 7. Results for TFP, output and markups. Longer time horizon

	De-investment Year	One year later	Two years later	Three years later	Four years later
			Δ log(TFP)		
Divestment	**-0.032*** **	**-0.054*** **	**-0.039*** **	**-0.048*** **	**-0.043*** **
	(0.010)	(0.011)	(0.011)	(0.011)	(0.012)
Observations	206	206	206	206	206
R-squared	0.047	0.101	0.054	0.085	0.066
			Δ log(Output)		
Divestment	-0.063	**-0.313** **	**-0.381** **	**-0.367** **	**-0.318***
	(0.119)	(0.142)	(0.154)	(0.162)	(0.173)
Observations	214	214	214	214	214
R-squared	0.001	0.022	0.026	0.022	0.016
			Δ log(Markup)		
Divestment	-0.158	**-0.307** **	-0.188	**-0.264***	-0.224
	(0.115)	(0.131)	(0.136)	(0.143)	(0.149)
Observations	206	206	206	206	206
R-squared	0.009	0.027	0.010	0.017	0.011

Notes: Bootstrapped standard errors are listed in parentheses. A constant is included in all specifications, but not reported. *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

Table 8. Formerly fully versus partially foreign owned affiliates

	Divestment year	One year later	Two years later
		Δ log(TFP)	
Divestment	**-0.039*** **	**-0.041*** **	**-0.039*** **
	(0.009)	(0.010)	(0.010)
Divestment * 100% foreign owned	0.005	-0.006	0.002
	(0.014)	(0.015)	(0.016)
100% foreign owned	0.005	-0.000	0.006
	(0.008)	(0.010)	(0.011)
Observations	314	314	314
R-squared	0.094	0.095	0.066
		Δ log(Markup)	
Divestment	**-0.292** **	**-0.314** **	-0.229
	(0.143)	(0.153)	(0.146)
Divestment * 100% foreign owned	0.037	0.064	0.057
	(0.219)	(0.235)	(0.246)
100% foreign owned	-0.030	-0.095	-0.084
	(0.122)	(0.133)	(0.153)
Observations	314	314	314
R-squared	0.021	0.020	0.011
		Δ log(Output)	
Divestment	**-0.372*** **	**-0.512*** **	**-0.674*** **
	(0.125)	(0.163)	(0.169)
Divestment * 100% foreign owned	0.096	0.291	0.424
	(0.213)	(0.264)	(0.283)
100% foreign owned	0.047	-0.077	-0.168
	(0.127)	(0.169)	(0.195)
Observations	328	328	328
R-squared	0.036	0.036	0.053

Notes: Bootstrapped standard errors are listed in parentheses. A constant is included in all specifications, but not reported. *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

Table 9. Are former greenfield affiliates affected more?

	Divestment year		One year later		Two years later	
			Δ log(TFP)			
Divestment	**-0.035*** **	**-0.039*** **	**-0.040*** **	**-0.041*** **	**-0.033*** **	**-0.039*** **
	(0.007)	(0.009)	(0.008)	(0.010)	(0.008)	(0.011)
Divestment * Greenfield	-0.031	-0.040	**-0.045***	-0.048	**-0.078** **	**-0.091*** **
	(0.027)	(0.028)	(0.027)	(0.029)	(0.033)	(0.033)
Divestment * 100% foreign owned		0.013		0.005		0.021
		(0.013)		(0.014)		(0.018)
Greenfield	0.003	-0.001	-0.001	-0.001	0.044*	0.046**
	(0.010)	(0.011)	(0.014)	(0.016)	(0.023)	(0.023)
100% foreign owned		0.006		0.000		-0.003
		(0.009)		(0.010)		(0.012)
Observations	314	314	314	314	314	314
R-squared	0.098	0.107	0.110	0.111	0.082	0.087

Notes: Bootstrapped standard errors are listed in parentheses. A constant is included in all specifications, but not reported. *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

Table 10. Comparison of divested plants to domestic plants

	log(TFP)	log(Output)	log(Markup)	log(Employment)	log(Employment production)	log(Employment non-production)	log(Average wage)	log(Domestic sales)	Share of output exported	Share of imported inputs	Skill intensity
Divested	**0.016*** **	**0.202*** **	**0.028** **	**0.875*** **	**0.849*** **	**0.886*** **	**0.120*** **	**-0.552*** **	**5.209*** **	**0.082*** **	**0.010*** **
	(0.001)	(0.019)	(0.013)	(0.040)	(0.041)	(0.034)	(0.011)	(0.089)	(0.456)	(0.005)	(0.002)
log(Employment)	-0.009***	1.296***	0.224***				0.169***	0.921***	6.117***	0.034***	0.011***
	(0.001)	(0.009)	(0.004)				(0.007)	(0.036)	(0.230)	(0.001)	(0.001)
Observations	337,571	370,975	337,398	399,384	395,679	344,208	399,182	399,382	399,384	381,550	380,295
R-squared	0.021	0.596	0.098	0.011	0.010	0.007	0.062	0.044	0.068	0.039	0.007
Divested	**0.019*** **	**0.295*** **	**0.049** **	**0.943*** **	**0.913*** **	**0.956*** **	**0.145*** **	**-1.493*** **	**14.422*** **	**0.113*** **	**0.014*** **
(year of divestment)	(0.002)	(0.036)	(0.024)	(0.047)	(0.049)	(0.043)	(0.020)	(0.179)	(1.101)	(0.010)	(0.004)
Divested	**0.018*** **	**0.223*** **	**0.046**	**0.851*** **	**0.831*** **	**0.862*** **	**0.114*** **	**-0.932*** **	**8.318*** **	**0.091*** **	**0.010***
(year later)	(0.002)	(0.043)	(0.031)	(0.057)	(0.058)	(0.055)	(0.024)	(0.226)	(1.192)	(0.011)	(0.005)
Divested	**0.013*** **	**0.140*** **	**0.012**	**0.788*** **	**0.763*** **	**0.800*** **	**0.103*** **	0.012	-0.118	**0.060*** **	**0.008*** **
(subsequent years)	(0.001)	(0.021)	(0.014)	(0.043)	(0.044)	(0.039)	(0.013)	(0.108)	(0.489)	(0.006)	(0.003)
log(Employment)	-0.009***	1.296***	0.223***				0.169***	0.922***	6.109***	0.034***	0.011***
	(0.001)	(0.009)	(0.004)				(0.007)	(0.036)	(0.229)	(0.001)	(0.001)
Observations	337,571	370,975	337,398	399,384	395,679	344,208	399,182	399,382	399,384	381,550	380,295
R-squared	0.021	0.596	0.098	0.011	0.010	0.007	0.062	0.044	0.070	0.039	0.007

Notes: Robust (clustered on industry-year) standard errors are listed in parentheses. All regressions include industry-year fixed effects.
*, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

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